I CLAIM:

1. A heater assembly for mounting around a fluid flow channel in an injection molding apparatus, the heater assembly comprising:

an inner tube comprising a first heat conductive material having a first coefficient of thermal expansion, the inner tube having a selected longitudinal length, an inner surface, and an outer surface;

a first ring having an inner surface engaged around the outer surface of the inner tube along a short selected length of the longitudinal length of the inner tube, the first ring comprising a second material having a second coefficient of thermal expansion that is less than the first coefficient of thermal expansion; and

a heater mechanism capable of heating the inner tube to a selected elevated temperature.

2. The heater assembly of claim 1 further comprising an outer tube receiving and mounted around the outer surface of the inner tube, the first ring mounting the outer tube in a fixed position around the outer surface of the inner tube, the outer tube being mounted such that an inner surface of the outer tube is spaced a distance from the outer surface of the inner tube.

3. The heater assembly of claim 2 wherein the heater mechanism is mounted within the space between the inner tube and the outer tube.

4. The heater assembly of claim 3 further comprising a second ring having an inner surface engaged around the outer surface of the inner tube along a second short selected length of the longitudinal length of the inner tube, the second ring comprising a material having a coefficient of thermal expansion that is less than the first coefficient of thermal expansion.

5. The heater assembly of claim 4 wherein the second ring mounts the outer tube in the fixed position around the outer surface of the inner tube in cooperation with the first ring.

6. The heater assembly of claim 1 wherein the short selected length extends from a first terminal end of the inner tube, the first ring being mounted at and around the first terminal end of the inner tube.

7. The heater assembly of claim 4 wherein the second short selected length extends from a second terminal end of the inner tube, the second ring being mounted at and around the second terminal end of the inner tube.

8. The heater assembly of claim 4 wherein the short selected length of the first ring extends from a first terminal end of the inner tube, the first ring being mounted at and around the first terminal end of the inner tube, and wherein the second short selected length extends from a second terminal end of the inner tube, the second ring being mounted at and around the second terminal end of the inner tube.

9. The heater assembly of claim 1 wherein the inner tube and the first ring expand radially upon heating to select elevated temperatures, the second material of the first ring being selected such that the first ring expands less radially than the inner tube expands radially upon said heating, the first ring restricting radial expansion upon said heating.

10. The heater assembly of claim 4 wherein the inner tube and the second ring expand radially upon heating to select elevated temperatures, the material of the second ring being selected such that the second ring expands less radially than the inner tube expands radially upon said heading, the second ring restricting radial expansion upon said heating.

11. The heater assembly of claim 4 wherein the inner tube and the first ring expand radially upon heating to select elevated temperatures, the second material of the first ring being selected such that the first ring expands less radially than the inner tube expands radially upon said heating, the first ring restricting radial expansion of the inner tube upon said heating; and, wherein the inner tube and the second ring expand radially upon heating to select

elevated temperatures, the material of the second ring being selected such that the second ring expands less radially than the inner tube expands radially upon said heating, the second ring restricting radial expansion upon said heating.

12. The heater assembly of claim 2 wherein the heater mechanism is mounted in the space between the inner tube and the outer tube in engagement with the outer surface of the inner tube and is spaced a distance from the inner surface of the outer tube.

13. The heat assembly of claim 12 wherein the heater mechanism comprises an electrically conductive material of high resistance connected to a source of electrical energy for controllably heating the conductive material by controlled application of electrical energy to the conductive material.

14. The heater assembly of claim 1 in which the inner tube has a body length and a slot extending through the body length of the inner tube.

15. The heater assembly of claim 1 in which the inner surface of the first ring has screw threads and the outer surface of the inner tube has screw threads on said short selected length where the first ring engages around the outer surface of the inner tube, said screw threads on the first ring and the inner tube being complementary.

16. The heater assembly of claim 4 in which the inner surface of the second ring has screw threads and the outer surface of the inner tube has screw threads on said second short selected length where the second ring engages around the outer surface of the inner tube, said screw threads on the second ring and the inner tube being complementary.

17. A heater assembly for mounting around a fluid flow channel in an injection molding apparatus, the heater assembly comprising:

an inner tube comprising a first heat conductive material, the inner tube having a selected longitudinal length, an inner surface and an outer surface;

a first ring having an inner surface engaged around the outer surface of the inner tube along a short selected length of the longitudinal length of the inner tube;

a second ring having an inner surface engaged around the outer surface of the inner tube along a second short selected length of the longitudinal length of the inner tube; and

a heater mechanism mounted around and in engagement with the outer surface of the inner tube.

18. The heater assembly of claim 17 wherein the tube comprises a first material having a first coefficient of thermal expansion, the first and second rings comprise a second material having a second coefficient of thermal expansion, the first coefficient of thermal expansion being greater the second coefficient of thermal expansion.

19. The heater assembly of claim 17 wherein the inner tube and the first ring expand radially upon heating to select elevated temperatures, the inner tube comprises a first material, and the first and second rings comprise a second material, the second material of the first and second rings being selected such that the first and second rings expand less radially than the inner tube expands radially upon said heating, the first and second rings restricting radial expansion of the inner tube upon said heating.

20. The heater assembly of claim 17 in which said first and second rings are made from a shape memory alloy that causes the first and second rings to reduce in diameter when the first and second rings are heated above a threshold temperature so as to positively clamp the inner tube on a portion of said injection molding apparatus forming said fluid flow channel.

21. A heater assembly for mounting around a fluid flow channel in an injection molding apparatus, the heater assembly comprising:

a tube comprising a heat conductive material, the tube having a selected longitudinal length, an inner surface, and an outer surface;

a ring having an inner surface engaged around the outer surface of the tube along a short selected length of the longitudinal length of the tube, the ring being made from a shape memory alloy that causes the ring to reduce in diameter when the ring is heated above a threshold temperature so as to positively clamp the inner tube on a portion of said injection molding apparatus forming said fluid flow channel during use of the heater assembly; and

a heater mechanism capable of heating the tube to a selected elevated temperature.

22. A heater assembly according to claim 21 further comprising an outer tube receiving and mounted around the outer surface of the first mentioned tube, said ring mounting the outer tube in a fixed position around the outer surface of the first mentioned tube, the outer tube being mounted such that an inner surface of the outer tube is spaced a distance from the outer surface of the first mentioned tube.

23. A heater assembly according to claim 22 wherein the heater mechanism is mounted within the space between the first mentioned tube and the outer tube.

24. A heater assembly according to claim 23 further comprising a second ring having an inner surface engaged around the outer surface of the first mentioned tube along a second short selected length of the longitudinal length of the first mentioned tube, the second ring being made from a shape memory alloy that causes the second ring to reduce in diameter when the second ring is heated to positively clamp the first mentioned tube on a portion of said injection molding apparatus forming said fluid flow channel during use of the heater assembly.

25. A heater assembly according to claim 24 wherein the second ring mounts said outer tube in the fixed position around the outer surface of the first mentioned tube in cooperation with the first mentioned ring.

26. A heater assembly according to claim 23 wherein the short selected length extends from a first terminal end of the first mentioned tube, the ring being mounted at and around said first terminal end of the first mentioned tube.

27. A heater assembly according to claim 24 wherein the first mentioned ring and the second ring are made from the same shape memory alloy.